

CLAIMS

We claim:

1. A communication controller comprising:
a memory circuit;
5 a processor operable in response to data and instructions stored in the memory circuit;
a first communication circuit under control of the processor for communicating between the communication controller and a first remote device according to a first data communication standard; and
10 a second communication circuit under control of the processor for communicating between the communication controller and a second remote device according to a second data communication standard, the second data communication standard being different from the first data communication standard.
- 15 2. The communication controller of claim 1 wherein the memory circuit, the processor, the first communication circuit and the second communication circuit are integrated in a single integrated circuit.
3. The communication controller of claim 1 wherein the first communication circuit comprises a ProfiBus communication circuit.
- 20 4. The communication controller of claim 3 wherein the first communication circuit comprises a ProfiBus controller.
5. The communication controller of claim 1 wherein the second communication circuit comprises an Ethernet bus controller.
- 25 6. The communication controller of claim 1 wherein the second communication circuit comprises a Controller Area Network (CAN) bus controller.

7. The communication controller of claim 6 wherein the CAN bus controller comprises a logic circuit configured to receive and transmit data according to the CAN standard.

8. The communication controller of claim 6 wherein the second communication circuit comprises two or more a Controller Area Network (CAN) bus controller circuits.

9. The communication controller of claim 1 further comprising an Ethernet bus controller under control of the processor for communicating between the communication controller and a third remote device according to Ethernet data communication standard.

10. The communication controller of claim 1 further comprising an asynchronous serial data communication circuit.

11. The communication controller of claim 10 wherein the CAN bus controller comprises two or more asynchronous serial data communication circuits.

12. The communication controller of claim 9 further comprising an internal communication bus coupled to the processor, the first communication circuit, the second communication circuit and the Ethernet bus controller.

13. The communication controller of claim 1 further comprising a Serial Peripheral Interconnect (SPI) bus controller.

14. The communication controller of claim 1 wherein the memory circuit comprises:

a boot read only memory; and
read-write memory.

15. The communication controller of claim 14 wherein the asynchronous serial data communication circuit comprises:

two or more programmable asynchronous serial data port.

16. A data communication device comprising:
first communication means for external communication according to a first
standard network communication protocol;
second communication means for external communication according to a
second standard network communication protocol; and
processing means for data processing, the processing means including
communication control means for controlling operation of the first
communication means and the second communication means.

17. The data communication device of claim 16 wherein the first
communication means comprises ProfiBus communication means for external
communication according to ProfiBus communication protocol.

18. The data communication device of claim 17 wherein the first
communication means comprises a data communication circuit configured to
implement one of Controller Area Network (CAN) bus data communication
protocol and Ethernet data communication protocol.

19. The data communication device of claim 18 wherein the processing
means comprises:

a processor coupled to the first communication means and the second
communication means; and
memory means for storing data and instructions for operation by the
processor.

20. The data communication device of claim 18 further comprising:
an interface means for serial communication with an external data source
for loading at least a portion of the memory means upon
initialization of the data communication device.

21. An integrated circuit comprising:
a processor block which controls operation of the integrated circuit;
a memory block which stores data and instructions for use by the processor
block;
5 a first data communication port;
a ProfiBus control block coupled with the first data communication port;
a second data communication port;
a Controller Area Network (CAN) control block coupled with the second
data communication port; and
10 an internal bus coupling the processor block, the memory block the
ProfiBus control block and the CAN control block.

22. The integrated circuit of claim 21 further comprising: a second
CAN control block coupled to the internal bus.

23. The integrated circuit of claim 21 further comprising:
15 an Ethernet control block coupled to the internal bus.

24. A ProfiBus controller comprising:
a ProfiBus core;
a processor;
a memory;
20 at least one control circuit which controls wireline data communications
according to a standard other than ProfiBus standard; and
an internal bus for internal data communications within the ProfiBus
controller.

25. The ProfiBus controller of claim 24 wherein the at least one control
circuit comprises a Controller Area Network (CAN) bus controller.

26. The ProfiBus controller of claim 24 wherein the at least one control
circuit comprises two or more Controller Area Network (CAN) bus controllers.

27. The ProfiBus controller of claim 25 wherein the at least one control circuit comprises an Ethernet bus controller.

28. The ProfiBus controller of claim 27 wherein the processor comprises a serial communication port for external data communication.

29. The ProfiBus controller of claim 28 further comprising:
program code stored in a first portion of the memory and executable by the processor for controlling loading of data and instructions from an external data source by the serial communication port to a second portion of memory.

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